PULASKI POOL

ECM 1: Lighting Retrofit – Pulaski Pool

Ameresco will implement a lighting system retrofit that will include the following:

- Replace T12 lamps and magnetic ballasts with T8 lamps and electronic ballasts
- Install new T8 lamps in the same quantity as existing
- Replace highbay HID fixtures in the pool with new 2x4, 6 lamp T8 fixtures
- Replace exit signs with LED exit signs

All retrofit fluorescent fixtures will be thoroughly cleaned and dusted in order to maximize fixture performance. Where technically feasible, electronic ballasts will be tandem wired. Discolored, missing, or broken lenses will be replaced with new lenses.

Old T12 fluorescent lamps, high intensity discharge (HID) lamps, and any ballasts that contain PCB's will be carefully recycled and disposed of by Ameresco through a licensed recycling firm in accordance will all state and federal guidelines.

New electronic ballasts will carry a comprehensive five (5) year manufacturer warranty. All T8 lamps installed will carry a minimum three (3) year manufacturer warranty.

Lighting Retrofit

Building **Pulaski Pool**

Fixture Type	Area/ Location	System Type		Quantity
		Existing	Proposed	
2x2 HID Recessed	Pool Deck	1000W Metal Halide	920W MH Relamp	16
10" Recessed Downlight	Lobby / Lockers / Halls	100W Mercury Vapor	32W CF Retrofit	30
8" Recessed Downlight	Foyer / Corridors	100W Mercury Vapor	32W CF Retrofit	40
8" Recessed Downlight	Exterior Entries	100W Mercury Vapor	32W CF Retrofit	3
8" Wall Cylinders	Lobby / Lockers / Halls	100W Mercury Vapor	32W CF Retrofit	8
12" Rec Wallmount	Pool Mezzanine	100W Mercury Vapor	32W CF Retrofit	8
Track	Pool	Incandescent R40	32W CF Track Fixture	14
HID Surface Cylinders	Pool Mezzanine	400W Metal Halide	New 2x4 T8 Elec Highb	7
Wallpack	Locker Rooms	250W MH	New 120W Induct Fixt	2
1x4 2L Wrap	Pool Offices	T12 Magnetic	ES T8 LP Elec	7
1x4 2L Recessed	Pool Offices / Lockers	T12 Magnetic	ES T8 LP Elec	30
1x3 2L Recessed	Locker Rooms	T12 Magnetic	ES T8 LP Elec	18
RLM	Office Closet	Incandescent	New Keyless CF Fixt	1
1x4 1L Fluor Strip	Pool Office Area	T12 Magnetic	ES T8 LP Elec	3
Canopy	Front Exterior Entry	100W Mercury Vapor	32W CF Retrofit	8
Pole Mount Luminaire	Front Driveway	250W HPS	120W Induction Lumina	4
Wallmounted Jar	Front Exterior Entry	Incandescent	50W MH Wallpack	2
Wallpack	Exterior Wallmount	250W MH	New 120W Induct Fixt	7
Totals:				**208**

ECM 2: Upgrade Pneumatic Controls with DDC Controls – Pulaski Pool

Ameresco will implement a partial upgrade to the existing pneumatic control system with a DDC based control system. This controls upgrade will include the following:

- Remove the controls devices from existing control panels and install TAC I/NET Seven DDC control components. The existing control panel enclosures will be reused. The TAC I/NET Seven is the same control system that is already in operation in the Milwaukee County Domes.
- Replace two (2) existing dampers immediately upstream of the air-to-air heat exchanger and replace with new dampers having a chemically resistant coating (Heresite). New dampers will have Stainless Steel shaft and bearings.
- The upgraded control system will have the following control points/features for AHU-1 and 2.
    - Start/stop control of the fan
    - Supply fan status and return fan status
    - Supply and exhaust air temp
    - Exhaust air leaving the heat exchanger
    - Temperature leaving heat exchanger to fan
    - Temperature leaving the preheat coil
    - Preheat coil valve
    - Hot water control valve
    - Face and bypass control
    - Low limit for preheat coil
    - Low limit for heating coil
    - Zone temperature
    - Pressure dP between pool and outside air
- The upgraded control system will have the following control points/features for RTU-1
    - Start/stop control of the fan
    - Fan status
    - Supply air temp
    - Heat stage 1

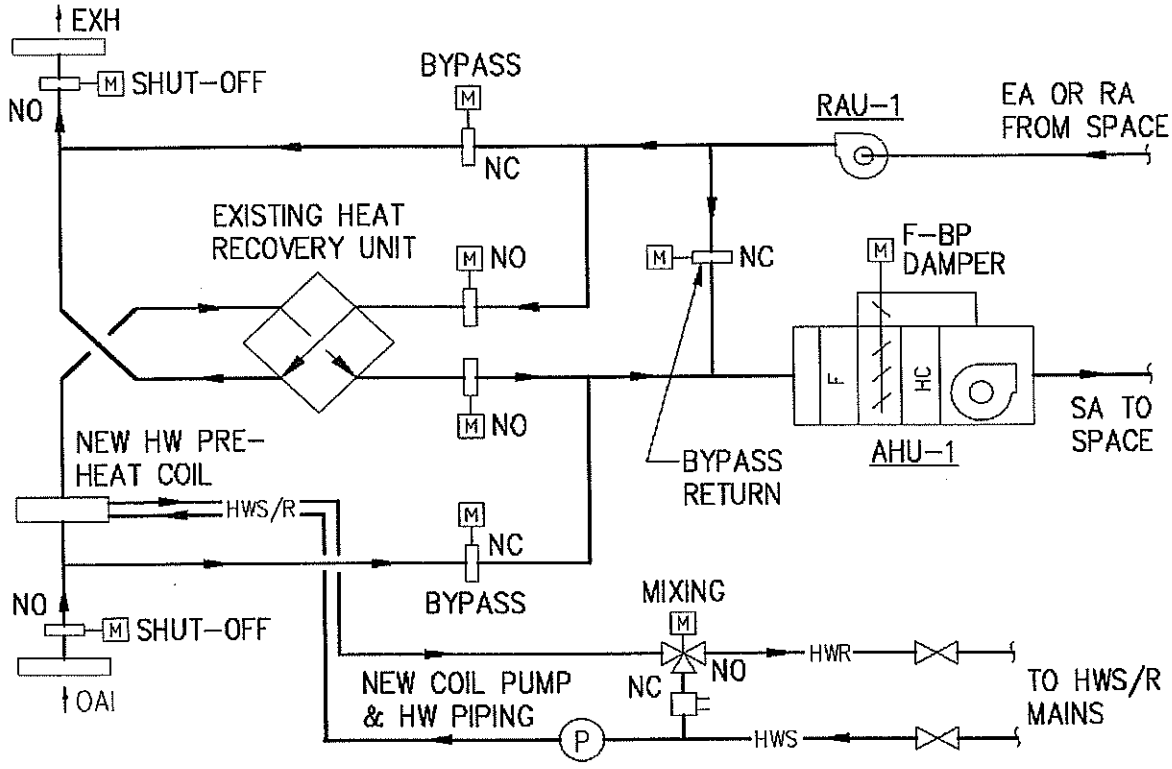
- DX stage 1
- Zone temperature

- The upgraded control system will have the following control points/features for the boiler room:
  - Boiler enable
  - Boiler status
  - Hot water supply temperature
  - Pump 1 and 2 enabled
  - Pump 1 and 2 status
- Provide new operator work station including mouse, printer, and 15" CRT screen. The new workstation will have graphical operator interface. Work station will be installed in a room designated by the County.
- Provide enhanced graphical interface capability that includes the following features
  - On screen floor plan with sensor location. CAD drawings in digital format to be furnished by Park District.
  - Point and click setpoint adjustment capability. This will allow the user to make setpoint adjustment by clicking on a screen icon
- Existing pneumatic control features to remain except as specified above
- Replace up to eight (8) damper actuators if required.
- Implement the following energy savings control strategies:
  - Unoccupied and Seasonal Zone Temperature Reset
  - Temperature Reset of Air and Water Systems
  - Optimum Start/Stop of HVAC Equipment
- Train operating personnel on the use of the new control system

ECM 3: Install Preheat Coil for HV-1 and HV-2 – Pulaski Pool

Ameresco will retrofit air handlers HV-1 and HV-2 with a hot water preheat coil upstream of the air-to-air heat exchanger. The preheat coil loop will be designed to temper the outside air sufficiently to keep the air-to-air heat recovery unit from freezing up. The hot water coil will be connected to the hot water heating loop. The preheat loop will include a mixing valve and a small circulating pump (Refer to Fig 1). The circulating pump will keep the water circulating through the coil to keep it from freezing during the cold weather. During non-freezing weather the pump will turn off and no water will circulate through the

Figure 1



AIR HANDLING & HEAT RECOVERY SYSTEM DIAGRAM

preheat coil. By adding only enough heat to the outside air to keep the air-to-air heat exchanger from freezing, free energy from the exhaust air will be extracted and transferred to the incoming outside air.

As part of the system improvement described above, Ameresco will perform the following work:

- Remove a small portion of the outside air ductwork for HV-1 to allow the installation of a preheat coil.
- Install a preheat coil in the outside air duct.
- Install a hot water supply and return line and tap the lines to the existing heating supply and return headers.
- Install a fractional horsepower in-line pump and a mixing valve to regulate the water flow and temperature of the water flowing to the preheat coil (See Figure 1)
- Install a power circuit for the preheat coil pump. Power will be fed from a local power panel. Reuse a space breaker or install a new breaker as required.
- Install new electric actuator on the new mixing valve.
- Install a temperature sensor to measure the air temperature immediately downstream of the preheat coil
- Connect the controls devices to the new control system (an upgraded DDC system is assumed).
- Reinsulate ductwork and insulate all new hot water lines.
- Test all control dampers located in the air handler room to ensure proper operation.
- Repair and/or replace dampers that do not function correctly. Up to 4 dampers will be replaced entirely as required.
- Repair and/or replace damper actuator with electric or pneumatic actuators. Up to 4 damper actuators will be replaced as required.
- Air balance the air handler and water balance the preheat loop.

In addition to the work described above, Ameresco will vacuum clean the inside surface of the air intake ductwork up to the air handler. Ameresco will also vacuum clean the inside surfaces of the air handler and replace the air filters. Cleaning of the supply and return air ductwork has not been included

ECM 5: Seal Building Envelope – Pulaski Pool
Ameresco will perform the following work to improve the weather tightness of the building:

Exterior

- West Side - 24 doors 4'x8' with1 fixed windows 4'x3' and 1 fixed window 4'x5' to be sealed
- West Side - 2 single steel door to be weather- stripped
- North Side - 3 single steel doors to be weather- stripped
- North Side - 1 overhead door 9'x9' to be weather- stripped and sealed
- East Side - 2 double commercial door to be weather- stripped
- South Side - 3 single steel doors to be weather- stripped
- South Side - 1 double commercial door to be weather- stripped
- Roof - 1 exhaust vent 3'x3' to be sealed
- Roof - 1 exhaust vent 2'x2' to be sealed

Interior

- Stair Wells - 80' of roof wall intersection to be sealed
- Pool Area - 494' roof wall intersection to be sealed
- Boiler Room - 1 single steel door to be weather- stripped
- Storage Rooms - 63' of roof wall intersection to be sealed